RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)					DATE **February 2000**				
BUDGET ACTIVITY **03 - Advanced Technology Development**				PE NUMBER AND TITLE **0603253F Advanced Sensor Integration**					
COST ($ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	13,512	9,327	5,350	5,084	5,357	5,178	5,381	Continuing	TBD
632735 Avionics Integration Technology	9,422	5,901	1,992	1,547	751	460	747	Continuing	TBD
63666A Sensor Fusion & Integration Tech	4,090	3,426	3,358	3,537	4,606	4,718	4,634	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0

Note: In FY 2001, the following efforts in Project 632735 were moved into PE 0603726F, Project 634850: 1) developing technologies for collecting and integrating on- and off-board sensors over multiple platforms; 2) developing and demonstrating technologies to support maximum use of existing avionics software together with new software in real-time environments; 3) developing and demonstrating advanced architecture concepts to support seamless information flow and fusion for application in space and unmanned aerial vehicles. Also in FY 2001, efforts to develop and evaluate multi-user, medium to high capacity airborne platform information transfer technology transferred from Project 63666A to PE 0603726F, Project 634850.

(U) A. Mission Description

This program develops and demonstrates advanced radio frequency sensors and integration techniques for intelligence, surveillance, and reconnaissance functions. Specifically, this program develops and improves: digital receiver components for air moving target indication and advanced unmanned aerial vehicle applications; advanced Global Positioning System receivers and anti-jam techniques for aerospace platforms; aircraft communications, navigation, and identification technologies; technologies for low-probability-of-detection communication between aircraft to improve aircrew situation awareness; and collaborative engineering environments to evaluate methods for integrating on-board and off-board sensor data.

(U) B. Budget Activity Justification

This program is in Budget Activity 3, Advanced Technology Development, since it develops and demonstrates technologies for existing system upgrades and/or new sensor and electronic combat system developments that have military utility and address warfighter needs.

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BUDGET ACTIVITY 03 - Advanced Technology Development	PE NUMBER AND TITLE 0603253F Advanced Sensor Integration

(U) **C. Program Change Summary ($ in Thousands)**

		FY 1999	FY 2000	FY 2001	Total Cost
(U)	Previous President's Budget (FY 2000 PBR)	10,462	9,443	11,984	
(U)	Appropriated Value	10,536	9,443		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions	-74	-3		
	b. Small Business Innovative Research	-233			
	c. Omnibus or Other Above Threshold Reprogram		-51		
	d. Below Threshold Reprogram	3,359			
	e. Rescissions	-76	-62		
	f. Other				
(U)	Adjustments to Budget Years Since FY 2000 PBR			-6,634	
(U)	Current Budget Submit/FY 2001 PBR	13,512	9,327	5,350	TBD

(U) Significant Program Changes:

Changes to this program since the previous President's Budget reflect the transfer of work to align projects with the Air Force Research Laboratory organization.

Exhibit R-2 (PE 0603253F)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2000

BUDGET ACTIVITY 03 - Advanced Technology Development	PE NUMBER AND TITLE 0603253F Advanced Sensor Integration	PROJECT 632735

COST ($ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
632735 Avionics Integration Technology	9,422	5,901	1,992	1,547	751	460	747	Continuing	TBD

(U)   A. Mission Description

Develops and demonstrates advanced radio frequency (RF) sensors for integrated intelligence, surveillance, and reconnaissance functions on aerospace platforms. These advanced technologies will enable sensors to gather and process information from air- and space-based assets, integrate on-board and off-board sensor data, and perform sensor management functions.

(U)   FY 1999 ($ in Thousands)

(U) $5,129   Developed and demonstrated advanced modular, sharable RF sensor processor technologies to provide for avionics cost and weight savings, increased multimission capability, improved reliability, and increased sensor data fusion opportunities. Demonstrated integrated sensor system technology for simultaneously performing radar, electronic warfare, communication, navigation, and identification functions.

(U) $1,694   Developed technologies for collecting and integrating sensor data from various sources in a collaborative engineering environment in order to reduce risks and costs of advanced technology demonstration and to enable faster transition of affordable technology to meet warfighter needs. Developed a collaborative engineering capability and evaluated sensor data in a collaborative environment.

(U) $2,599   Developed and demonstrated technologies to support maximum use of existing avionics software in concert with newly developed software in a real-time avionics environment, thereby providing a cost-effective incremental upgrade capability, including optimizing testing of technology for simultaneous execution of existing 16-bit avionics software with 32-bit application software and develop preliminary architectural framework.

(U) $9,422   Total

(U)   FY 2000 ($ in Thousands)

(U) $1,848   Develop and demonstrate advanced modular, sharable RF sensor technologies for aerospace sensor suites performing intelligence, reconnaissance, and surveillance applications. Design a dual-use modular, digital RF receiver. Conduct trade studies for air moving target indication.

(U) $2,463   Develop technologies for collecting and integrating on- and off-board sensors over multiple platforms in a collaborative engineering environment, reducing cost and risk of advanced technology demonstration. Evaluate on-board and off-board sensors and multiple platforms in a collaborative engineering environment. (In FY 2001, this work will transfer to PE 0603726F, Project 634850.)

(U) $425   Develop and demonstrate technologies to support maximum use of existing avionics software together with new software in real-time environments. Transition these technologies to fighter and transport aircraft. (In FY 2001, this work will transfer to PE 0603726F, Project 634850.)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY **03 - Advanced Technology Development**	PE NUMBER AND TITLE **0603253F Advanced Sensor Integration**	PROJECT **632735**

(U)   **A. Mission Description Continued**

(U)   FY 2000 ($ in Thousands) Continued

(U) $1,165   Develop and demonstrate advanced architecture concepts to support seamless information flow and fusion for application in space and unmanned aerial vehicles (UAVs). Develop UAV architecture concepts applicable to multiple UAV applications. Develop an Assured Space Access Architecture (ASAA) for the space maneuver vehicle as well as the command and control information infrastructure needed for ASAA. (In FY 2001, this work will transfer to PE 0603726F, Project 634850.)

(U) $5,901   Total

(U)   FY 2001 ($ in Thousands)

(U) $1,992   Develop and demonstrate advanced modular, sharable digital radio frequency (RF) sensor technologies for aerospace sensor suites performing intelligence, reconnaissance, and surveillance applications. Fabricate and test dual-use, modular, digital RF receiver components for multimode radar operation.

(U) $1,992   Total

(U)   **B. Project Change Summary**
    Not Applicable.

(U)   **C. Other Program Funding Summary ($ in Thousands)**
(U)   Related Activities:
(U)   PE 0603204F, Aerospace Sensors.
(U)   PE 0603203F, Advanced Aerospace Sensors.
(U)   PE 0603270F, Electronic Combat Technology.
(U)   This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U)   **D. Acquisition Strategy**
    Not Applicable.

(U)   **E. Schedule Profile**
(U)   Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE **February 2000**

BUDGET ACTIVITY **03 - Advanced Technology Development**	PE NUMBER AND TITLE **0603253F Advanced Sensor Integration**	PROJECT **63666A**

COST ($ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
63666A Sensor Fusion & Integration Tech	4,090	3,426	3,358	3,537	4,606	4,718	4,634	Continuing	TBD

(U) A. Mission Description

Develops and demonstrates advanced reference and information transmission technologies required for precise navigation and targeting and reliable information links for future Air Force information architectures. Specifically, this projects develops the advanced techniques for exploiting and protecting the capabilities of the Global Positioning System (GPS) to provide highly accurate reference data for precision targeting and location of enemy air defense radars. In addition, this project develops high-speed, jam-resistant, low-probability-of-detection information transmission technologies and techniques to improve overall aircrew situation awareness, reduce electromagnetic signatures of navigation and communication systems, and increase aircraft survivability. The focus is on transitioning transceivers, inertial components, navigation system technology into air vehicles. Technologies demonstrated under this project are needed for real-time information in the cockpit, stealth operations, precision targeting and strike, timely bomb damage assessment, force multiplication through multiplatform shared resources, and supportable weapon systems.

(U) FY 1999 ($ in Thousands)

(U) $2,694   Developed enhancements to GPS user equipment and system integration techniques to maximize position accuracy and jam resistance and exploit the benefits of GPS to improve offensive and defensive combat capabilities at reduced costs. Developed optimum anti-jam techniques and techniques for precision attack using improved GPS.

(U) $1,396   Developed multi-user, medium to high capacity, jam-resistant airborne network technology to provide for low probability of detection exchange of time-critical threat, sensor, and other information between aircraft and cooperative assets. Completed evaluation of a common, affordable, open system architecture for unmanned aerial vehicles.

(U) $4,090   Total

(U) FY 2000 ($ in Thousands)

(U) $2,626   Develop reference and receiver technologies to maximize GPS jam resistance, positional accuracy, and exploitation techniques to improve offensive and defensive combat capabilities. This includes integrating and receiver processor technology, direct acquisition techniques, and evaluation of GPS modernization candidate military signals for exploitable vulnerabilities.

(U) $800   Develop and evaluate multi-user, medium to high capacity airborne platform information transfer technology to provide jam-resistant, lower probability of detection exchange of information between aircraft and cooperating space, airborne, and surface communication assets. Fabricate a space-based air traffic communications and positioning brassboard. (In FY 2001, this work will transfer to PE 0603726F, Project 634850.)

(U) $3,426   Total

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2000	
BUDGET ACTIVITY **03 - Advanced Technology Development**	PE NUMBER AND TITLE **0603253F Advanced Sensor Integration**	PROJECT **63666A**

(U)   A. Mission Description Continued

(U)   FY 2001 ($ in Thousands)

(U) $3,358   Develop technologies to maximize Global Positioning System (GPS) jam resistance, positional accuracy, and exploitation techniques to improve offensive and defensive combat capabilities. Refine GPS receiver processing technology and direct signal acquisition techniques. Continue evaluation of GPS modernization candidate military signals for exploitable vulnerabilities.

(U) $3,358   Total

(U)   B. Project Change Summary
      Not Applicable.

(U)   C. Other Program Funding Summary ($ in Thousands)
(U)   Related Activities:
(U)   PE 0602204F, Aerospace Sensors.
(U)   PE 0602782A, Command, Control, Communications Technology.
(U)   PE 0602232N, Navy C3 Technology.
(U)   PE 0603203F, Advanced Aerospace Sensors.
(U)   PE 0603270F, Electronic Combat Technology.
(U)   This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U)   D. Acquisition Strategy
      Not Applicable.

(U)   E. Schedule Profile
(U)   Not Applicable.